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Gerrinae in University of Kansas Collections*

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ABSTRACT: This paper is based upon a study of 10,785 specimens of Gerrinae in the Francis Huntington Snow Collections of the University of Kansas. Keys to the genera of Gerrinae and Ptilomerinae and to the species of the Western Hemisphere are given. Besides many new records of distribution the following new forms are described: *Gerris ampla arizonensis* new var. from Arizona, U. S. A.; *Gerris fuscinervis invertis* new var. from Peru, S. A.; *Limnogonus visendus* Drake and Harris, winged form from Brazil, S. A.; *Limnogonus celeris magnus* new var. from Bolivia, Brazil, and British Guiana, S. A.; *Limnogonus aduncus uncatus* new var. from Peru, S. A.; *Tenagogonus spinulatus* sp. nov. from Peru, Bolivia, and Ecuador, S. A.; *Tenagogonus duolineatus* sp. nov. from Bolivia, Paraguay, and Peru, S. A.; *Cylindrostethus palmaris* Drake and Harris, winged form from Bolivia, Brazil, and British Guiana, S. A.; and *Cylindrostethus bilobata* sp. nov. from Bolivia, S. A.

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INTRODUCTION

THE family Gerridae is universally distributed. It is divided into five subfamilies one of which is the subfamily Gerrinae which includes the largest of the American waterstriders. This paper includes a brief review of family and subfamily characters, a description of the Genera found in the Western Hemisphere, tables for the separation of species, and notes regarding the material in the University of Kansas Francis Huntington Snow Entomological collections. References are given to original descriptions and other important nomenclatorial descriptions relative to the genera and species.

In the genus *Gerris* there are representatives of all the species except *Gerris comatus mickeli* var., and *Gerris uhleri*. There are 4,913 specimens in the collection and two new varieties are herein recognized in the genus.

In the genus *Limnogonus* there are representatives of all the species except *Limnogonus genticus*. There are 3,655 specimens in the collection. The winged form of *Limnogonus visendus* is herewith described along with varieties of *Limnogonus celeris* and *Limnogonus aduncus*.

In the genus *Tenagogonus* there are representatives of all the known species and two species new to science are herein described. There are 461 specimens in the collection.

In the genus *Cylindrostethus* there are representatives of all the known species and the winged form, heretofore not known for this genus, along with a new species are herein described. There are 1,089 specimens in the collection.

In the genus *Potamobates* there are representatives of eight of the ten known species. There are 667 specimens in the collection.

ACKNOWLEDGMENT

The writer wishes to express his sincere appreciation for the helpful suggestions and kindly criticisms of Dr. H. B. Hungerford, of the University of Kansas, under whose direction this work was undertaken. Also to Dr. R. H. Beamer for his timely and helpful suggestions.

FAMILY GERRIDAE Amyot and Serville, 1843

Head horizontal, shorter than pro- and mesonota united, somewhat declivent in front of eyes. Antennae inserted in front of eyes, filiform, 4-segmented, the ringlike segment between two and three being considered as a part of the third. Rostrum short or long, 4-segmented. Body beneath densely clothed with short, appressed pile. Abdominal spiracles normal. Metasternal orifice (omphalium) median, often more or less prominent. Claws antepical, inserted in a cleft a little before apex of last tarsal segment. Anterior legs comparatively short, raptorial, the femora more or less incrassate. Intermediate and hind legs very long, slender. Fore coxae considerably removed from middle pair, the middle and hind pairs placed close together.

KEY TO GROUPS OF GERRIDAE

The Gerrids are divided into five subfamilies which are separated into two groups as follows:

- A. Inner margins of eyes sinuate or concave behind the middle. Body and abdomen comparatively long and narrow. Subfamilies Gerrinae and Ptilomerinae.
- AA. Inner margins of eyes convexly rounded. Body and abdomen comparatively short and broad. Subfamilies Rhagadotarsinae, Haloveliinae, and Halobatinae.

KEY TO SEPARATE GERRINAE AND PTILOMERINAE

The subfamilies of Gerrinae and Ptilomerinae are separated as follows:

- A. First segment of the antennae shorter than the other three conjoined; middle and hind femora not longer than the whole length of the body.....*Gerrinae*.
- AA. First segment of antennae not shorter than the other three conjoined. Middle and hind femora, or at least one of them, longer than the whole length of the body*Ptilomerinae*.

SUBFAMILY GERRINAE Bianchi, 1896

Small or large, usually long, sides subparallel. General color brown to black, frequently marked with brilliant silvery pubescence. Thorax modified or changed according to degree of wing-development within a species (apterous, brachypterous, or macropterous). Abdomen composed of six visible segments (in reality seven as the first is not discernible beneath) and two genital segments. Pterygomorphism peculiar to many species. In alate forms hemelytra somewhat coriaceous, the nervures strongly developed and prominent. This subfamily is represented in the Western Hemisphere by five genera. *Potamobates* of Champion is the only genus restricted to the Americas.

KEY TO GENERA OF SUBFAMILY GERRINAE

- | | |
|---|---------------------------------|
| 1a. Antennae shorter than body..... | 2a |
| 1b. Antennae practically as long or longer than body..... | 8a |
| 2a. (1a) Body four times or more as long as broad..... | 3a |
| 2b. Body shorter, not four times as long as broad..... | 4a |
| 3a. (2a) Rostrum long, reaches middle of mesothorax..... | <i>Onychotrechus</i> Kirkaldy |
| 3b. Rostrum short, not reaching base of prosternum..... | <i>Cylindrostethus</i> Fieber |
| 4a. (2b) Basal tarsal subsegment of fore legs about half as long as second..... | 5a |
| 4b. Basal tarsal subsegment of fore legs subequal with second..... | 7a |
| 5a. (4a) Middle and hind legs short..... | <i>Rheumatotrechus</i> Kirkaldy |
| 5b. Middle and hind legs very long, femora extending beyond apex of abdomen.... | 6a |
| 6a. (5b) Metasternum divided by a transverse suture; appears bisegmented. | |
| | <i>Potamobates</i> Champion |
| 6b. Metasternum entire..... | <i>Limnogonus</i> Stal |
| 7a. (4b) Each tarsus terminated by two strong, curved, apical, aroliated claws. | |
| | <i>Eotrechus</i> Kirkaldy |
| 7b. Tarsus not so terminated with claws..... | <i>Gerris</i> Fabricius |
| 8a. (1b) Fourth segment of antennae longest..... | <i>Tenagogonus</i> Champion |
| 8b. First segment of antennae longest..... | <i>Potametropsis</i> Lundblad |

KEY TO GENERA OF SUBFAMILY PTILOMERINAE

- | | |
|---|-------------------------------------|
| 1a. First antennal segment shorter than the three following combined. Fore tibia without terminal spines..... | <i>Rheumatogonus</i> Kirkaldy |
| 1b. First antennal segment much longer than the last three together. Fore tibia with terminal spines..... | 2a |
| 2a. Hind femur with spines, male larger than female, middle leg fringed with hairs. | |
| | <i>Ptilomera</i> Amyot and Serville |
| 2b. Hind femur without spines. Male smaller or size of female, middle leg not fringed with hairs..... | 3a |
| 3a. Body very short and broad, not longer than three times the breadth. | |
| | <i>Potamometra</i> Bianchi |
| 3b. Body elongate, longer than three times the breadth..... | 4a |
| 4a. First segment of anterior tarsi more than twice as long as second (including female <i>Esakobates</i>)..... | <i>Heterobates</i> Bianchi |
| 4b. First segment of anterior tarsi not so long (except female <i>Esakobates</i>)..... | 5a |
| 5a. First anterior tarsal segment of male less than double the second, that of female two and one-half times as long as second..... | <i>Esakobates</i> Lundblad |
| 5b. First anterior tarsal segment of both sexes less than twice as long as second.... | 6a |
| 6a. Connexivum of female drawn out into a long spinelike apophysis.... | <i>Pleciobates</i> Esaki |
| 6b. Connexivum of female wanting or when present not spinelike..... | 7a |
| 7a. Female much larger than male. Last abdominal segment of female not drawn out..... | <i>Rhyacobates</i> Esaki |
| 7b. Both sexes of same size, last abdominal segment of female drawn out into two long, broad lobes..... | <i>Teratobates</i> Esaki |

I. GENUS *GERRIS* Fabricius, 1794Logotype, *lacustris* (Linnaeus)

Gerris Fabricius, Ent. Syst., IV, 1794, p. 187; Latreille, Consid. Genl., 1810, pp. 259, 434 (names *lacustris* type); Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 144; Bergroth; Ent. Mo. Mag., (2) XIII, 1902, pp. 258-260; Distant, Fauna Brit. India, Rhyn., II, 1904, p. 176; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 208; Torre-Bueno, Trans. Amer. Ent. Soc., XXXVII, 1911, p. 244; Van Duzee, Cat. Hemip., 1917, p. 426; Hungerford, Bull. Univ. Kansas, XXI, 1919, p. 108.

Aquarius Schellenberg, Geschl. Land-und Wass. Wanz., 1800, p. 25.

Hydrometra Lamarek, Syst. Anim. s. Vert., 1801, p. 295 (in part); Fabricius, Syst. Rhyn., 1803, p. 256; Mayr, Reise Freg. Novara, Zool. II, Hemip., 1868, p. 169.

Hygotrechus Stal, Ofv. Vet. Akad. Forh., XXV, 1868, p. 395; Uhler, Stand. Nat. Hist., II, 1884, p. 267.

Limnopus Stal, Ofv. Vet. Akad. Forh., XXVII, 1868, pp. 395-396; Bergroth, Proc. U. S. Nat. Mus., LI, 1916, p. 237.

Limnotrechus Stal, Ofv. Vet. Akad. Forh., XXVII, 1868, p. 395.

Head short; eyes large, prominent, exerted. Antennae moderately slender, usually reaching hind margin of pronotum. Rostrum moderately short, reaching to or a little beyond the pro-mesosternal suture. Body subparallel, clothed with short, golden hairs.

In the apterous form the pronotum usually long, its hind lobe often covering a considerable part or even all of mesonotum, or sometimes short and not produced behind. Hemelytra, when present, dark, the nervures raised and prominent. Legs variable in length in different species, sometimes extremely long; middle and posterior femora and tibiae long; fore tarsal segments subequal in length. Body beneath covered with dense pile. Male genital segments symmetrical.

The genus *Gerris* is universally distributed, occurring on every continent. Thirty-two species and varieties are recognized from Continental and Insular America, two varieties of which are described below as new to science. Since *Gerris summatris* is known only from female specimens it is not included in the key. Pterygopolymorphism is common, many species being represented by macropterous, brachypterous, and apterous individuals. The nonshiny superior surface of head and thorax and the short golden pubescence upon upper surface of body and nervures of hemelytra serve to separate *Gerris* from *Limnogonus*.

KEY TO SPECIES OF *GERRIS* (MALES)

- 1a. Venter simply emarginate at apex. Connexival spines very long, reaching to or slightly beyond the middle of the last genital segment (except in *chilensis* Berg). 2a
 1b. Venter doubly emarginate behind, the second emargination forming a more or less distinct notch at the middle. Connexival spines much shorter or wanting..... 8a
 2a. Venter deeply, angularly, excavated behind, somewhat V-shaped.
uhleri Drake & Harris
 2b. Venter deeply rounded, emarginate behind, broadly U-shaped..... 3a
 3a. Connexival spines very short, inconspicuous..... *chilensis* (Berg)

- 3b. Connexival spines quite long, prominent. 4a
- 4a. First antennal segment subequal to or distinctly longer than II and III conjoined, color very dark 5a
- 4b. First antennal segment shorter than II and III conjoined. Body reddish brown or marked with reddish brown. 6a
- 5a. First antennal segment longer than II and III conjoined. Last segment of venter without distinct median depression. *conformis* (Uhler)
- 5b. First antennal segment subequal to II and III conjoined. Last segment of venter with a prominent, deep, broad, depressed median furrow. *nebularis* Drake & Harris
- 6a. Smaller, 8 to 11 mm. First genital segment with median keel at base. *caniculatus* Say
- 6b. Larger, 12 to 20 mm. First genital without median keel at base. 7a
- 7a. Body long, with very long legs. Apex of first genital almost truncate. *notabilis* Drake & Harris
- 7b. Shorter, with shorter legs. Apex of first genital slightly roundly produced. *dissortis* Drake & Harris
- 8a. Connexiva not produced into distinct spines at apex. Segment I of antennae not or scarcely more than three-fifths as long as II and III conjoined. Anterior femora strongly curved 23a
- 8b. Connexiva distinctly produced at apex. Segment I of antennae as long as or almost as long as II and III conjoined. Fore femora not strongly curved. 9a
- 9a. Large robust species (11 mm. or more). Connexival spines rather long and conical. First genital segment with very prominent, strongly elevated keel. 10a
- 9b. Smaller species (less than 11 mm.). Connexival spines short, angular. First genital segment with keel only moderately prominent or absent. 13a
- 10a. Larger, usually more or less brownish in coloration. 11a
- 10b. Smaller, with shorter legs and antennae. Color deep black. *nyctalis* Drake & Harris
- 11a. Connexivum terminating in rather long pointed, sharp, spine. Hind margin of apical segment of venter not flared. *remigis* Say
- 11b. Connexivum terminating in very short and blunt spines. Hind margin of apical segment of venter flared 12a
- 12a. Hind margin of last ventral abdominal segment very prominently flared, making a deep transverse depression *ampla* Drake & Harris
- 12b. Hind margin with a slight flare making a very shallow transverse depression. *ampla arizonensis* n. var.
- 13a. First genital segment beneath with conspicuous, long silvery hairs on each side. . 14a
- 13b. Genital segment without long hairs. 15a
- 14a. Anterolateral margins of pronotum with a more or less distinct brownish line. First genital segment with hairs arranged in rows along each side of median ridge. *incognitus* Drake & Harris
- 14b. Pronotum without pale stripe along side margin in front. Hairs on first genital segment forming a distinct tuft. *comatus* Drake & Harris
- 15a. Anterolateral margins of pronotum with a silvery or rufous stripe. *lutea*
- 15b. Anterolateral margins without pale stripe. 16a
- 16a. Omphalium strongly produced, very prominent. *alacris* Hussey
- 16b. Omphalium not especially prominent. 17a
- 17a. First genital segment plump, scarcely impressed on each side. *inseparatus* Drake & Harris
- 17b. First genital segment strongly impressed on each side. 18a
- 18a. First tarsal segment shorter than second. *firma* Drake & Harris
- 18b. First tarsal segment subequal to second. 19a
- 19a. Notch at hind margin of sixth venter broadly rounded. *incurvatus* Drake & Harris
- 19b. Notch at apex of sixth venter deeper, not so broadly rounded. *marginatus* Say
- 20a. First genital segment as broad as long, the notch in middle at apex of sixth venter, subrectangular *buenoi* Kirkaldy
- 20b. First genital segment distinctly longer than broad, narrowed posteriorly, median apical notch of venter rounded. 21a
- 21a. Anterolateral stripe of pronotum silvery. *argenticollis* Parshley
- 21b. Anterolateral stripe of pronotum flavous to brownish. 22a
- 22a. Connexivum above with small silvery spots between the segments. *gillettei* Lethierry & Severin

- 22b. Connexivum without silvery spots.....*pingreensis* Drake & Harris
- 23a. Metasternum and venter with distinct or fairly distinct median carina. Pronotum extending on mesonotum in apterous form. First genital segment longer than broad 24a
- 23b. Metasternum and venter not carinate. Pronotum in apterous form not extending back over mesonotum. First genital segment short.....*flavolineatus* Champion
- 24a. Fore femora strongly curved from the base, suddenly dilated beneath into a tubercle-like prominence. Omphalium more or less prominent..... 25a
- 24b. Anterior femora much more flattened on basal half, without stout oblong prominence 28a
- 25a. First antennal segment in length distinctly greater than width of head through eyes. Protuberance of front femora near basal third.....*carmelus* Drake & Harris
- 25b. First antennal segment in length subequal to or less than width of head through eyes. Femoral protuberance at or beyond the middle..... 26a
- 26a. Fore femora with prominence at middle. Front lobe of pronotum in apterous form only moderately elevated 27a
- 26b. Fore femora with prominence at distal third. Anterior lobe of pronotum in apterous form strongly elevated.....*beieri* Drake & Harris
- 27a. Omphalium very strongly developed, forming an oblong prominence.
cariniventris Champion
- 27b. Omphalium not especially prominent.....*kahli* Drake & Harris
- 28a. Mesonotum in apterous form covered by pronotum.....*mexicanus* Champion
- 28b. Pronotum of apterous form not reaching to middle of mesonotum..... 29a
- 29a. Segments II, III, and IV of antennae subequal.....*fuscinervis* (Berg)
- 29b. Segment IV of antennae much shorter than either II or III.
fuscinervis invertis n. var.

1. *Gerris conformis* (Uhler)

Hygrotrechus conformis Uhler, Proc. Bost. Soc. Nat. Hist., XIX, 1878, p. 435.
Gerris conformis Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 271, fig. 1, g.
Gerris conformis (Uhler), Ann. Carn. Mus., Vol. XXIII, p. 185, 1934.

Sixteen apterous and macropterous specimens from the following states: Pennsylvania, Wisconsin, New York, South Carolina, and Ohio.

2. *Gerris nebularis* Drake and Hottes

Gerris nebularis Drake and Hottes, Proc. Biol. Soc. Wash., 28, 1925, p. 70; Drake and Harris, Ohio Jour. Sci., XXVIII, 1928, p. 270, fig. 1, c.
Gerris nebularis Drake and Hottes, Ann. Carn. Mus., XXIII, 1934, p. 186, Pl. XXIII, fig. e.

Twenty-two apterous and macropterous specimens from the following states: Florida, Alabama, Kansas, Mississippi, Georgia, and North Carolina.

3. *Gerris uhleri* Drake and Hottes

Gerris uhleri Drake and Hottes, Proc. Biol. Soc. Wash., 38, 1925, p. 69; Drake and Harris, Ohio Jour. Sci., XXVIII, 1928, p. 271, fig. 1, e; Drake and Harris, Ann. Carn. Mus., Vol. XXVIII, p. 186, Pl. XXIII, fig. g.

No representatives of this species.

4. *Gerris chilensis* (Berg)

Limnotrechus chilensis Berg, Ann. Soc. Cient. Argentina, XXII, 1881, p. 263.
Gerris chilensis Lethierry and Severin, Cat. Gen. Hemip., III, 1896, p. 60; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., 1908, p. 208; Drake and Harris, Ann. Carn. Mus., 1934, p. 187.

Fifty-five apterous specimens from Santiago de Chile, S. A., and Termes Caupuenes, Chile, S. A.

5. *Gerris canaliculatus* Say

Gerris canaliculatus Say, Heter. N. Harmony, 1832, p. 36; Torre-Bueno, Trans. Amer. Ent. Soc., XXXVII, 1911, p. 248; Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 187, Pl. XXIV, fig. a.

Three hundred and twelve apterous and macropterous specimens from the following states: Florida, Georgia, Mississippi, Texas, Virginia, North Carolina, Alabama, Arkansas.

6. *Gerris dissortis* Drake and Harris

Gerris rufoscutellatus Riley, Ent. Rec. and Journ. Var., XXVII, 1925, pp. 65-72, 86-93, and 109-115.

Gerris dissortis Drake and Harris, Bull. Brook. Ent. Soc., XXV, 1930, p. 145.

One hundred and twenty-three macropterous specimens from the following states: New Hampshire, New York, New Jersey, Michigan, Wisconsin, North Dakota, Minnesota, and Russell, Manitoba.

7. *Gerris notabilis* Drake and Hottes

Gerris notabilis Drake and Hottes, Ohio Journ. Sci., XXV, 1925, p. 46; Drake and Harris, *ibid.*, XXVIII, 1928, p. 272, fig. 1, d; Drake and Harris, Ann. Carn. Mus., 1934, p. 189, Pl. XXIII, fig. d.

Eighteen winged paratypes and 168 other winged specimens. From the following states: South Dakota, Idaho, Washington, Oregon, Utah, Colorado, Arizona, and California.

8. *Gerris ampla* Drake and Harris

Gerris ampla Drake and Harris, Pan-Pacific Ento., 1938, Vol. XXIV, p. 73.

Thirty-eight apterous and macropterous specimens. All from the District of Temascaltepec, Real de Arriba, Mexico.

9. *Gerris ampla arizonensis* new var.

Length.—16 mm. to 17 mm. Antennal proportions of *Gerris ampla arizonensis*: Male, 135:67:62:70; female, 135:67:62:70. For *Gerris ampla*: Male, 158:82:74:75; female, 142:73:65:70.

Comparative notes.—In between *G. ampla* and *G. remigis* but closer to *G. ampla*. It differs from *G. remigis* in having shorter and stouter connexival spines, longer first antennal segment, much more prominently raised hind margin of last ventral abdominal segment of male; a lateral flavcus line on pronotum, and a much broader and deeper emargination of last ventral abdominal segment of male. It differs from *G. ampla* by not having as distinctly raised hind margin of the last ventral abdominal segment, carina on first genital ventral

being not prominent to apex, the emargination of the last ventral abdominal segment is shallower and broader and the depression of last ventral abdominal is shallower.

Holotype, allotype, and thirty-three apterous and macropterous paratypes from the following localities: Huachuca Mt., Ariz.; Chiricahua Mts., Ariz.; and Santa Rita Mts., Ariz.

10. *Gerris remigis* Say

Gerris remigis Say, Heter. New Harmony, 1832, p. 35; Torre-Bueno, Ent. News, XXVIII, 1917, pp. 201-208; Riley, Ann. Ent. Soc. Amer., XIV, 1921, pp. 231-289; Essenberg, Journ. Animal Behavior, V, 1915, pp. 397-402; Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 269, fig. 1, a.

Gerris orba Stal, Freg. Eugen. Resa, Ins., 1859, p. 2641.

Hygrotrechus robusta Uhler, Am. Journ. Sci., Ser. 3, I, 1871, p. 105.

Gerris remigis Say, Drake and Harris, Ann. Carn. Mus., 1934, Vol. XXIII, p. 189, Pl. XXIII, fig. c.

Four hundred and twenty-nine apterous and macropterous specimens from following states: California, Washington, Arizona, Texas, Utah, New Mexico, Montana, Oklahoma, Indiana, Michigan, Pennsylvania, Maine, and Connecticut.

11. *Gerris nyctalis* Drake and Hottes

Gerris nyctalis Drake and Hottes, Ohio Journ. Sci., XXV, 1925, p. 47; Drake and Harris, *ibid.*, XXVIII, 1928, p. 269, fig. 1, b; Drake and Harris, Ann. Carn. Mus., 1934, Vol. XXIII, p. 190, Pl. XXIII, fig. b.

Eleven apterous and macropterous specimens from Tooele county, Utah; Estes Park, Colo.; Paradise, Utah; Sherborn, Mass.; and S. Saskatchewan, Canada.

12. *Gerris inseperatus* Drake and Hottes

Gerris inseperatus Drake and Hottes, Proc. Biol. Soc. Wash., 38, 1925, p. 71; Blatchley, Heter. E. North Amer., 1925; Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 270; Drake and Harris, Ann. Carn. Mus., 1934, Vol. XXIII, p. 190, Pl. XXII, fig. b.

Forty-five macropterous specimens from following localities: Fairmont, West Virginia; Warrenton, Virginia; Ithaca, New York; Beaufort, North Carolina; Smithville, Mississippi; Arendtsville, Pennsylvania; Cochise county, Arizona; and Aguascalientes, Mexico.

13. *Gerris marginatus* Say

Gerris marginatus Say, Heter. N. Harmony, 1832, p. 36; Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 271; Drake and Harris, Ann. Carn. Mus., 1934, Vol. XXIII, p. 191, Pl. XXII, fig. f.

One hundred and sixty-six apterous and macropterous specimens from following states: Texas, California, Wyoming, North Carolina, Oregon, Alabama, Minnesota, New Mexico, Kansas and Arkansas.

14. *Gerris incurvatus* Drake and Hottes

Gerris incurvatus Drake and Hottes, Proc. Biol. Soc. Wash., 38, 1925, p. 72; Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 270; Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 192, Pl. XXII, fig. j.

Two hundred and three apterous, brachypterous, and macropterous specimens from following states: California, Washington, Idaho, Wyoming, Montana, Oregon, Texas, and from Oliver, Brit. Columbia.

15. *Gerris alacris* Hussey

Gerris alacris Hussey, Psyche, XXVIII, 1921, pl. II, fig. 1; Blatchley, Heter. E. N. America, 1925, p. 975; Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 272; Drake and Harris, Ann. Carn. Mus. XXIII, 1934, p. 192, pl. XXII, fig. 1.

One male paratype and 6 other macropterous specimens. The paratype from Berrien county, Michigan. Others from Cherokee county, Kansas; Ft. Lee Dist., New Jersey; Lakehurst, New Jersey; Raleigh, North Carolina; and Freyburg, Maine. Heretofore not known from Maine, Kansas, and North Carolina.

16. *Gerris comatus* Drake and Hottes

Gerris comatus Drake and Hottes, Ohio Journ. Sci., XXV, 1925, p. 48; Drake and Harris, *ibid.*, XXVIII, 1928, p. 270; Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 193, Pl. XXII, figs. c and d.

Two paratypes and 156 other macropterous specimens. Paratypes from Ames, Iowa. Others from following states: New York, New Mexico, Minnesota, Michigan, South Dakota, Arizona, New Hampshire, Connecticut, Florida, Colorado, Indiana, Kansas, and from Mafeking, Manitoba.

17. *Gerris comatus mickeli* Drake and Hottes

Gerris comatus Drake and Hottes, Ohio Journ. Sci., XXV, 1925, p. 48; Drake and Harris, *ibid.*, XXVIII, 1928, p. 270; Drake and Harris, Ann. Carn. Mus. XXIII, p. 193.

No representatives.

18. *Gerris incognitus* Drake and Hottes

Gerris incognitus Drake and Hottes, Proc. Biol. Soc. Wash., 38, 1925, p. 73; Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 270; Drake and Harris, Ann. Carn. Mus. XXIII, p. 193, Pl. XXII, fig. a.

Two hundred and fifty-five apterous and macropterous specimens from following states: Washington, Idaho, Oregon, Montana, California, Colorado, and Wyoming.

19. *Gerris pingreensis* Drake and Hottes

Gerris pingreensis Drake and Hottes, Ohio Journ. Sci., XXV, 1925, p. 49; Drake and Harris, *ibid.*, XXVIII, 1928, p. 272; Drake and Harris, Ann. Carn. Mus. XXIII, 1934, p. 194.

Four hundred and thirty-seven paramorphotypes from Pingree Park, Colorado; 488 other apterous and macropterous specimens from Pingree Park and Estes Park, Colorado.

20. *Gerris gillettei* Lethierry and Severin

Limnotrechus productus Uhler, Hemip. Colo., 1895, p. 61.

Gerris gillettei Lethierry and Severin, Cat. Genl. Hemip., III, 1896, p. 60; Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 272; Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 194, Pl. XXII, figs. g and h.

Holomorphotype, allomorphotype, 8 paramorphotypes and 184 other apterous and macropterous specimens. Types from Emery county, Utah. Others from Wyoming.

21. *Gerris buenoi* Kirkaldy

Gerris buenoi Kirkaldy, Ent. News, XXII, 1911, p. 246; Torre-Buenoi, Trans. Amer. Ent. Soc., XXXVII, 1911, p. 248; Parshley, Ent. News, XXVII, 1916, pp. 103-104, fig. c; Hoffman, Ann. Ent. Soc. Amer., XVII, 1924, pp. 424-426; Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 195, Pl. XXII, fig. c; Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 272.

Four hundred and seventy-three apterous and macropterous specimens from following: Burley, Idaho; Cheboygan county, Mich.; Freyburg, Maine; Three Forks, Montana; Rochester, Washington; Trout Lake, Michigan; and from Oliver, Brit. Columbia.

22. *Gerris argenticollis* Parshley

Gerris argenticollis Parshley, Ent. News, XXVII, 1916, p. 103, fig. a; Drake and Harris, Ohio Journ. Sci., XXVIII, 1928, p. 272; Drake and Harris, Ann. Carn. Mus., XXIII, p. 196, Pl. XXII, fig. k.

Six macropterous specimens from Forest Hills, Massachusetts; Ithaca, New York; Berrien county, Michigan; and Kosciusko county, Indiana.

23. *Gerris mexicanus* Champion

Gerris mexicanus Champion, Biol. Centr. Amer., Rhynch., II, 1898, p. 147, Pl. IX, fig. 10; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 209; Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 196.

Eleven apterous and macropterous specimens from Michoacan, Tancitaro, Mexico. Altitude 6,586 feet.

24. *Gerris flavolineatus* Champion

Gerris flavolineatus Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 149, Pl. IX, figs. 13-15; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 209; Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 197, Pl. XXIV, fig. c.

One hundred and nineteen apterous and macropterous specimens from San Antonio, Mexico; Real de Arriba, District of Temascaltepec, Mexico; Rio Grande, Mexico; and from Guatemala.

25. *Gerris cariniventris* Champion

Gerris cariniventris Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 148, Pl. IX, figs. 11-12; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 208; Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 197, Pl. XXIV, fig. b.

Seven hundred and fifty-one apterous and four macropterous specimens from Rio Blanco, Ecuador, S. A.; Dept. Cajamarca, Peru,

S. A.; and State of Oaxaca, Mexico. The first two localities are new to science.

26. *Gerris fuscinerwis* (Berg)

Brachymetra fuscinerwis Berg, Com. Mus. Buenos Aires, 1, 1898, p. 3; Pennington, List Hemiptera-Heteroptera, Repub. Argentina, 1921, p. 31.

Gerris perseus Kirkaldy, Bull. Mus. Zool. Anat. Comp. Torino, XIV, 1899, No. 351 p. 1.

Gerris andromeda Kirkaldy, Bull. Mus. Zool. Anat. Comp. Torino, XIV, 1899, No. 351, p. 2, figs. 8, 9.

Gerris fuscinerwis Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 208; Drake and Harris, Ann. Carn. Mus. XXIII, 1934, p. 198.

Six hundred and sixty-three apterous and 12 macropterous specimens from Cochabamba, Bolivia, S. A. and La Granja Alta gracia Cordoba, Argentina, S. A.

27. *Gerris fuscinerwis invertis* new var.

The carina on the metasternum indistinct but otherwise running down to *G. fuscinerwis* in the Drake and Harris key. It differs from *G. fuscinerwis* by the last antennal segment being the shortest (proportions: Male, 62:51:55:48; female, 91:72:67:60), the emargination of the last ventral abdominal segment not being as deeply notched, the anterior lobe of the pronotum being more distinctly elevated and the posterior lobe more angular and slightly narrower. The colors vary from a bright rufous to a dark brown.

There are 164 apterous specimens from Vic. Pampa Hermosa, Peru, S. A.; Vic. San Pedro, Peru, S. A.; and near Viena Andes (semitropical, 2,600 meters above sea), Peru, S. A.

28. *Gerris kahli* Drake and Harris

Gerris kahli Drake and Harris, Ann. Carn. Mus. XXIII, 1934, p. 199.

Fifty-eight apterous and macropterous specimens from Ecuador, S. A.

29. *Gerris beieri* Drake and Harris

Gerris beieri Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 200.

Eight macropterous specimens from Kenskoff, Haiti, and Real de Arriba, Mexico.

30. *Gerris carmelus* Drake and Harris

Gerris carmelus Drake and Harris, Psyche, XXXIV, 1933, p. 108; Drake and Harris, Ann. Carn. Mus., XXIII, 1934, p. 201, Pl. XXV, fig. d.

One paratype and 12 other apterous and macropterous specimens. Paratype from Jamaica, near Troy; others from Buff Bay River, Jamaica.

31. *Gerris summatis* Drake and Harris

Gerris summatis Drake and Harris, Ann. Carn. Mus. XXIII, 1934, p. 201.

Holotype and one paratype (macropterous female) from Rio Surapiqui, Costa Rica.

II. Genus LIMNOGONUS Stal, 1868

Logotype, *hyalinus* Fabricius

Limnogonus Stal, Hemip. Fabr., I, 1868, p. 132; Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 151; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 210.

Lamprotrechus Reuter, Ofv. Finska Vet. Soc. Fork., XXV, 1882, p. 40.

Tenagogonus Van Duzee, Cat. Hemip., 1917, p. 429 (in part); Anderson, University of Kansas, Sci. Bull., XX, 1932, p. 298.

Body short to moderately elongate, the abdomen somewhat abbreviated in certain species, long in others; head and pronotum glabrous, shiny. Antennae shorter than body, the basal segment longest. Anterior tarsi with first segment short, only about half as long as second. Middle and hind legs very long, the femora extending far beyond the tip of abdomen.

The short basal tarsal segment of fore legs, shorter and stouter antennae, and the shiny surface of the head and pronotum are the chief characters separating *Limnogonus* from *Tenagogonus* and *Gerris*.

Thirteen species have been recognized and two new varieties are herein described. The winged form of *Limnogonus visendus* heretofore not known is described along with a variety of *L. aduncus* and *L. celeris*.

It should be noted that in some species female specimens are as yet unknown. Also in certain species both alate and apterous forms have not been described for both sexes. As a consequence of the great structural differences between these forms within a species, it has been impossible to construct a complete key. The table given below, however, will serve to identify all the forms now known.

KEY TO SPECIES OF LIMNOGONUS

- 1a. Pale markings on margins of pronotum continued anteriorly along the sides of the front lobe and extending to its front margin. (If interrupted or obsolete along side margins of front lobe then the length of antennal I is greater than width of head through eyes.)..... 11a
- 1b. Side margins of anterior lobe of pronotum without evidence of pale lines. Length of antennal I usually less than width of head through eyes, sometimes subequal.. 2a
- 2a. Apterous 3a
- 2b. Macropterous (*celeris* and *genticus* unknown in winged form)..... 8a
- 3a. Pronotum produced posteriorly, distinctly longer than broad, differentiated into two lobes 5a
- 3b. Pronotum short, broader than long, without evidence of hind lobe..... 4a
- 4a. Length of first antennal segment subequal to width of head through eyes. Apex of abdomen not surpassing basal one-fifth of hind femora.....*hesione* (Kirkaldy)

- 4b. Length of first antennal scarcely greater than width of vertex plus one eye. Abdomen much longer, extending to basal one-third of hind femora.
visendus Drake & Harris
- 5a. Pronotum reaching to metanotum, almost or completely covering mesonotum.... 6a
5b. Pronotum reaching to middle of mesonotum..... 7a
- 6a. First genital segment above narrow, tapering posteriorly, the apical margin not or scarcely notched at middle.....*lubricus* White
6b. First genital segment above very broad, the sides almost parallel, the hind margin deeply notched at middle.....*celeris* Drake & Harris
- 7a. Larger. Male, 5.6 mm.; female, 6.7 mm. Eyes as seen from the side almost spherical, not longer than deep.....*lotus* White
7b. Smaller. Male, 4.15 mm. Eyes as seen from the side flattened, plainly longer than deep.....*genticus* Drake & Harris
- 8a. Eyes globose, not longer than deep. Pronotum strongly constricted at the sides between the two lobes. Front femora with an oval blackish spot on the outer (posterior) surface before apical third.....*lotus* White
8b. Eyes longer than deep. Pronotum less strongly constricted at the sides. Front femora almost entirely blackish along distal half of posterior surface..... 9a
- 9a. Antennal segments I and II, except apices, brownish..... 10a
9b. Antennal segments I and II entirely fuscous to black.....*hesione* (Kirkaldy)
10a. Second genital segment with a distinct tuft of pale hairs on each side.
visendus Drake & Harris
- 10b. Second genital segment of male without tuft of pale hairs on each side.
lubricus White
- 11a. Antennal segment I less than width of head through eyes. Mesopleura broadly marked with reddish or russet brown along the upper sides...*ignotus* Drake & Harris
11b. Antennal segment I equal to or greater than width of head through eyes. Mesopleura above next to pronotal margins brown to black, sometimes interrupted with yellowish or silvery..... 12a
- 12a. Male 13a
12b. Female 18a
- 13a. First genital segment beneath produced at apex..... 15a
13b. First genital segment beneath not produced at apex..... 14a
- 14a. Metasternum distinctly swollen. First genital segment slightly impressed on each side.....*guerini* (Lethierry & Severin)
14b. Metasternum flat, not swollen; first genital segment beneath distinctly constricted across the middle, broader than distance between apices of connexiva.
profugus Drake & Harris
- 15a. First genital segment beneath with a tumid, almost hemispherical gibbosity, the apex produced at the middle into a prominent recurved spine...*recurvus* Drake & Harris
15b. First genital segment not as above..... 16a
- 16a. First genital segment beneath raised into an enormous keel, this greatly produced so that it extends as far posteriorly as does the dorsal part of the segment.
hyalinus (Fabricius)
- 16b. First genital segment not as above..... 17a
17a. Apex of first genital segment beneath produced at the middle into a short oblique point. Mesosternum plump.....*recens* Drake & Harris
17b. Apex of first genital segment beneath produced into a short, recurved tooth. Mesosternum broadly, shallowly impressed.....*aduncus* Drake & Harris
- 18a. Connexivum truncate at apex, not produced beyond corresponding abdominal tergite.
hyalinus (Fabricius)
- 18b. Connexivum more or less produced at apex, extending beyond last abdominal tergite 19a
- 19a. Last segment of venter rather sharply produced at the middle behind. Connexival spines moderately long.....*aduncus* Drake & Harris
19b. Last segment of venter more broadly rounded behind. Connexivum not so strongly produced apically 20a
- 20a. Upper portion of mesopleura largely reddish-brown, this not divided by a paler longitudinal stripe*recurvus* Drake & Harris
20b. Upper portion of mesopleura black, this divided by a more or less broad yellowish to silver stripe..... 21a

- 21a. Last venter more strongly produced, the central portion extending slightly farther posteriorly than the connexival processes. The yellowish-brown stripe of mesopleura expanded, arched above broader than the black.....*profugus* Drake & Harris
- 21b. Last segment of venter only slightly produced behind. Yellowish-brown stripe of mesopleura narrower, its sides practically parallel..... 22a
- 22a. Connexivum above with a broad, uninterrupted longitudinal yellowish-brown stripe.
guerini (Lethierry & Severin)
- 22b. Connexivum above with three to five large silvery to yellowish-brown spots, these sometimes more or less connected.....*rcens* Drake & Harris

1. *Limnogonus hesione* (Kirkaldy)

Gerris hesione Kirkaldy, Entomologist, XXXV, 1902, p. 137.

Tenagogonus hesione Barber, Bull. Am. Mus. Nat. Hist., XXXIII, 1914, p. 499; Drake and Harris, Ohio Jour. Sci., XXVIII, 1928, p. 273.

Limnogonus hesione Osborn and Drake, Ohio Nat., XV, 1915, p. 503, fig. 1; Blatchley, Heteroptera E. N. Amer., 1928, p. 179, fig. 194.

Four hundred and twenty-two apterous and macropterous specimens. The specimens were taken from the following states and areas: Missouri, North Carolina, Alabama, Oklahoma, Kansas, Florida, Mississippi, Louisiana, and from Catalina, Cuba.

2. *Limnogonus visendus* Drake and Harris

Limnogonus visendus Drake and Harris, 1934. Ann. Carn. Mus., XXIII, p. 215.

Three hundred and fifty-nine apterous and 44 macropterous specimens. The macropterous form is new to science and is here described for the first time. The apterous specimens bear the following area labels: Rio Purus, Castanha Region, Brazil, S. A.; Vic. Santo Antonio R., Brazil, S. A.; Vic. Joao Pessoa, R. Jurua, Brazil, S. A.

DESCRIPTION OF WINGED FORM

Size.—Length of males, 5.5 to 7 mm.; width, 1.7 to 2.3 mm.; length of females, 6 to 8 mm.; width, 2 to 2.8 mm.

Color.—Grayish-black. Head black with a broad yokelike mark above ochraceous to fulvous. Anterior lobe of pronotum moderately prominent, disc depressed with a median round fulvous spot. Prominent constriction between anterior and posterior lobes, posterior lobe extending on metanotum, indistinctly carinate, margined with fulvous to ochraceous line. Humeri moderately prominent, a slight transverse elevation between them. Hemelytra brownish, the nervures darker and prominent. The posterior lobe of pronotum punctate and covered with fine hair.

Holomorphotype, allomorphototype and 42 paramorphotypes in the Francis Huntington Snow Entomological Collections. These were taken from the following locations: Santo Antonio river, Brazil, S. A.; and Sao Phelipe river, Brazil, S. A.

3. *Limnogonus lubricus* White

Limnogonus lubricus White, Jour. Linn. Soc. Lond., Zoöl., XIV, 1879, p. 489; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 210.

Two hundred and eighty-eight apterous and macropterous specimens. Specimens from the following places: Santa Rosa del Yacuma, Bolivia, S. A.; State of Para, Lago Grande, Plantation Ogle, B. Guiana; Vic. Sani Beni, Peru, S. A.; R. Madeira, Porto Velho, Brazil, S. A.

4. *Limnogonus celeris* Drake and Harris

Limnogonus celeris Drake and Harris, Ann. Carn. Mus., XXIII, pp. 214-215, Pl. 25, fig. a.

Holotype, allotype, and one paratype. These were taken from locality of Villarrica, Paraguay, S. A.

5. *Limnogonus celeris magnus* new var.

Length, 8 mm.; width, 2.5 to 3.5 mm.

This form runs to *L. celeris*, using the length of the first antennal segment being shorter to subequal to the width of head through the eyes. Pale markings on margins of pronotum continued anteriorly along sides of front lobe on some specimens; obsolete on others. Macropterous forms are not included in key as *L. celeris* winged form is unknown. Distal half of front femora almost entirely blackish; antennal segments I and II brownish.

This variety differs from *L. celeris* by its larger size and antennal proportions. Proportions: apterous male: 88:56:42:47, macropterous specimens, 94:58:44:53. Posterior lobe of pronotum does not touch metanotum, but greatly exceeds the middle of mesonotum. The hind margin of first genital above not as deeply notched and penultimate segment of rostrum is dark brown. No apterous female specimens.

DESCRIPTION OF WINGED FORM

Pronotum black. Posterior lobe subangular reaching metanotum, margined with ochraceous, indistinctly carinated, widest across humeri. Humeri prominent. Anterior lobe medianly depressed, flavous spot in center. Hemelytra light brown, nervures darker. Hemelytra surpassing last genital segment.

Holotype, allotype and 46 macropterous paratypes. Holotype and allotype from R. Beni Cachuela, Esperanza, Bolivia, S. A.; Paratypes from R. Beni Cachuela, Esperanza, Bolivia, S. A.; Vic. Santo Antonio R., Brazil, S. A.; and Supuruni Creek, Brit. Guiana.

6. *Limnogonus lotus* White

Limnogonus lotus White, Jour. Linn. Soc. Lond., Zoöl., XIV, 1879, p. 488; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 210; Drake and Harris, Ann. Carn. Mus., XIX, 1930, p. 236.

One thousand and thirty-one apterous and macropterous specimens. These bear the following labels: Vic. Joao Pessoa, (Sao Phelipe) River, Jurua, Brazil, S. A.; Vic. Santo Antonio River, Brazil, S. A.; Supuruni Creek, British Guiana, S. A.; Rio Negro, Manaos Region, Brazil, S. A.; Porto America, Brazil, S. A.; R. Amazonas, Region de Itacoatiara, Brazil, S. A.; Dept. Huanuco, Vic. Leonpampa Jungle, Peru, S. A.; near New Amsterdam, Brit. Guiana, S. A.

7. *Limnogonus ignotus* Drake and Harris

Limnogonus ignotus Drake and Harris, Ann. Carn. Mus., Vol. 23, p. 205.

Holotype, allotype, 18 paratypes, and 76 other specimens. The types are from Villarrica, Paraguay, S. A.; Santa Cruz, Bolivia, S. A.; near New Amsterdam, Brit. Guiana, S. A. The other specimens are from the same localities and also the following: Vic. Rioja, Dept. San Martin, Peru, S. A.; Santa Ana del Yacuma, Bolivia, S. A.; Georgetown, Brit. Guiana, S. A.; E. Coast Demerara, Brit. Guiana, S. A.

8. *Limnogonus guerini* (Lethierry & Severin)

Gerris marginatus Guerin, Icon. Regne Anim., Ins., 1844, p. 351, Pl. 57, fig. 2; Guerin, in Ramon de la Sagra's Hist. fis., polit. y nat. de Cuba, Ins., 1857, p. 415.

Limnometra marginata Uhler, Proc. Zoöl. Soc. Lond., 1893, p. 706, 1894, p. 212.

Gerris guerini, Lethierry and Severin, Cat. Gen. Hemip., III, 1896, p. 61.

Limnogonus marginatus Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 152.

Limnogonus guerini Kirkaldy & Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 210; Drake and Harris, Psyche, XXXIX, 1933, p. 109.

Three hundred and fourteen apterous and macropterous specimens. These with the following labels: Havana, Cuba; Gonaives, Haiti; Punta Gorda, Brit. Honduras; Jamaica, B. W. I.; La Libertad, Chiapas, Mex.; Vic. Pacasmayo, Peru, S. A.; St. Thomas, Virgin Islands; Costa Rica, C. A.; Caba Rojo, P. Rico; Lesser Antilles; and Dept. Cajamarca, Peru, S. A.

9. *Limnogonus profugus* Drake and Harris

Limnogonus profugus Drake and Harris, Ann. Carn. Museum, XIX, 1930, p. 237; Ann. Carn. Museum, Vol. XXIII, 1934, p. 209.

Thirty-three apterous specimens from Rezenda Estado de Rio, Brazil, S. A.; Campinas Estado de Sao Paulo, Brazil, S. A.; Itaquaquecetuba, Brazil, S. A.

10. *Limnogonus genticus* Drake and Harris

Limnogonus genticus Drake and Harris, Ann. Carn. Museum, Vol. XXIII, p. 213.

No representatives.

11. *Limnogonus recurvus* Drake and Harris

Limnogonus recurvus Drake and Harris, Ann. Carn. Mus., XIX, 1930, p. 236; Ann. Carn. Museum, Vol. XXIII, pp. 210-211, Pl. 24, figs. j and k.

One hundred and eighty-three apterous and macropterous specimens. The specimens are from the following places: Santa Cruz, Bolivia, S. A.; Santa Rosa del Yacuma, Bolivia, S. A.; State of Para, Lago Grande, Brazil, S. A.; R. Madeira, Porto Velho, Brazil, S. A.

12. *Limnogonus hyalinus* (Fabricius)

Hydrometra hyalinus Fabricius, Syst. Rhyng., 1803, p. 258.

Limnogonus hyalinus Stal, Hemip. Fabr., I, 1868, p. 133; Ann. Carn. Museum, Vol. XXIII, p. 208, Pl. 25, fig. b.

Eighty apterous and macropterous specimens. From the following localities: Supuruni Creek, Brit. Guiana, S. A.; E. Coast Demerara, Brit. Guiana, S. A.; Trinidad, B. W. I.

13. *Limnogonus recens* Drake and Harris

Limnogonus hyalinus Champien, Biol. Centr.-Amer., Rhyng. II, 1898, p. 153, Pl. IX, fig. 18; Torre-Bueno, Trans. Am. Ent. Soc., XXVII, 1911, p. 245.

Tenagogonus hyalinus Drake and Harris, Ohio Jour. Sci., 1928, XXV, p. 273.

Limnogonus recens Drake and Harris, Ann. Carn. Museum, Vol. XXIII, p. 207, Pl. XXV, fig. c.

One paratype and 23 other apterous and macropterous specimens. The paratype from Punta Gorda, Honduras, B. W. I.; others from San Isidro, Costa Rica, C. A.; Talcha, Yucatan, Mex.; Chiapas, La Libertad, Mex.; Palpite Cienaga de Zapute, S. C. Prov. Cuba; Los Amates, Guatamela.

14. *Limnogonus aduncus* Drake and Harris

Limnogonus aduncus Drake and Harris, Psyche, XXXIX, 1933, p. 110.

Limnogonus aduncus Drake and Harris, 1934, Ann. Carn. Mus., Vol. XXXII, pp. 209-210, Pl. 24, fig. 1.

Seven hundred and twenty apterous and macropterous specimens. Specimens from following places: Manaos Region Rio Negro, Brazil, S. A.; Trinidad, B. W. I.; Ft. Clayton, C. Z.; Georgetown, Brit. Guiana, S. A.; Santo Rosa del Yacuma, Bolivia, S. A.; State of Para, Brazil, S. A.; Castanha Region Rio Purus, Brazil, S. A.; Vic. Sani Beni, Peru, S. A.; Dept. Amazonas, Peru, S. A.; Santa Cruz, Bolivia, S. A.; Vic. of San Pedro, Peru, S. A.; Dept. San Martin, Peru, S. A.

- 6a. Without black markings on head and thorax..... 7a
 6b. With black markings on head and thorax..... 9a
 7a. Venter of sixth abdominal segment, strongly, subquadrately produced at middle behind (fig. 2) *celocis* Drake & Harris
 7b. Venter of sixth abdominal segment not subquadrately produced posteriorly..... 8a
 8a. Venter of sixth abdominal segment broadly produced a long distance beyond short connexival spines (fig. 3)..... *spinulatus* sp. nov.
 8b. Venter narrowly, triangularly produced, spines longer ending at posterior margin of sixth venter (fig. 1)..... *opacus* (Champion)
 9a. Connexival spines long, extending over half their length beyond posterior margin of sixth venter (fig. 4)..... *duolineatus* sp. nov.
 9b. Connexival spines short, not exceeding posterior margin of sixth venter (fig. 5).
quadrilineatus (Champion)

1. *Tenagobius celocis* Drake and Harris

(Plate X, figs. 2, 2a)

Tenagobius opacus Drake and Harris, Ann. Carn. Mus., XIX, 1930, p. 235.

Tenagobius celocis Drake and Harris, *ibid.* XX, 1931, p. 267.

Macropterous and brachypterous specimens. Ninety-one specimens from following places: Dept. Huanuco, vic. of Afilador, Peru, S. A.; R. Beni Cachucla, Esperanza, Bolivia, S. A. Heretofore not known from Bolivia.

2. *Tenagobius spinulatus* sp. nov.

(Plate X, figs. 3, 3a)

Size.—Male, 8 to 11.7 mm. length; 2.3 to 2.9 mm. width. Female, 10.5 to 12.3 mm. length; 2.8 to 3.3 mm. width.

Color.—Brownish ferruginous above, pale ochraceous beneath. Head ferruginous, base of antennae dark brown, first two segments light brown, III and IV dark brown. Pronotum ferruginous, median ochraceous line on anterior lobe extending on anterior portion of posterior lobe, anterolateral margins with a pale testaceous stripe which continues on mesopleura to mesoacetabula. Posterior portion of posterior lobe darker, the submarginal groove filled with golden pubescence. Costal margin lighter. Rostrum ochraceous, apical segment black. Meso- and meta-acetabula with silvery spots. Brownish area on both sides of testaceous line.

Structural characteristics.—Antennal proportions: Male, 78:60:97:131; female, 78:57:98:134. Pronotum (anterior lobe) slightly depressed, moderately constricted between anterior and posterior lobe. Posterior lobe of pronotum extending on metathorax. Humeri moderately prominent. Rostrum almost reaching to middle of mesosternum. Mesosternum with narrow and moderately deep channel. Metasternum with broad and prominent carina. Fore femora with basal portion ochraceous, slightly curved, distal three-fourths darker. Tibia brown, distal (female) portion slightly enlarged gives a curved appearance to tibia. In the male, the last abdominal venter broadly,

roundly emarginate. First genital segment faintly transversely impressed about middle; dorsal posterior margin slightly concave. Ventral plate of second genital segment with a median pair of small dorsally projecting spinoid processes. Dorsal plate conical. Both genital segments hairy. Connexiva not produced; moderately broad. Last ventral abdominal shorter than preceding two segments. Female: connexiva very short, triangular. Sixth ventral abdominal segment produced a great distance beyond spines, the plate with posterior margin truncate. Dorsolateral margin of second ventral genital produced as toothlike projection near middle. See plate.

Comparative notes.—Very close to *Tenagogonus opacus*, but the male differs in having a spinoid process on dorsal margin of second genital ventral plate on either side. This varies in size in some specimens. The female has much shorter spines and the sixth ventral abdominal plate has a much broader projection which extends far beyond the connexival spines. There is much variation in color in this species; specimens from Bolivia being much lighter and without distinct lines.

Types.—Holotype, allotype, and 43 paratypes. Sixteen other specimens. All macropterous specimens. Types from Vic. Rioja, Dept. San Martin, Peru, S. A.; vic. Rio Negro, 790 mi. a. s. l. in R. Negro, Peru, S. A. Others with following labels: Road between Todos Santos and Palmer, R. Chapare, Bolivia, S. A.; Ecuador, S. A., Feb. 11, 23.

3. *Tenagogonus opacus* (Champion)

(Plate X, figs. 1, 1a)

Limnometra opaca Champion, Biol. Centr.-Amer., Rhyneh., II, p. 150, Pl. IX, 1898, figs. 16, 16a.

Tenagogonus opacus Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 209.

Twenty-five macropterous specimens. Near New Amsterdam, British Guiana, S. A.; Mera, and Tena, Ecuador; Ft. Clayton, C. Z.

4. *Tenagogonus duolineatus* sp. nov.

(Plate X, figs. 4, 4a)

Size.—Length (in mm.) of winged males, 7.5 to 8.3; width, 2.2 to 2.6; of winged females, 9.7 to 10.2; width, 2.6 to 2.8.

Color.—Only winged forms known. Head fulvous to ochraceous with median ochraceous line on anterior lobe which runs out about middle of posterior lobe. Lateral and posterior margins ochraceous to fulvous. Two broad fulvous lines bordered by black on anterior lobe of pronotum. Hemelytra fuscous with dark-brown nervures. Dark-brown line behind eye which is indistinct or tapers out on mesopleura. Rostrum light, last segment black. Antennae brown-

ish, apex of last segment darker. Broad black line beginning behind coxa of anterior legs, running out beyond middle of mesothorax. Silvery spots on meso- and meta-acetabula. Prosternum light, meso- and metasterna light with a silvery sheen.

Structural characteristics.—Antennal formula of males: 57:37:66:102; females, 68:48:77:109. The last segment distinctly twice as long as second. Rostrum almost reaching to middle of mesosternum. Mesosternum deeply, narrowly channeled. Male last ventral abdominal segment deeply and doubly emarginate, shorter than preceding two segments. Metasternum with prominent carina. Fore femur slightly curved; length, 2.1 mm.; light basally and darker apically. Tibia slightly curved; length, 1.97 mm.; dark brown. First genital lightly transversely impressed near middle of segment. A patch of silvery hairs on either side of median line. Both genital segments hairy. Female is larger, stouter than male. Mesosternum very shallowly channeled. Last ventral abdominal segment produced, very broadly truncate. Connexival spines produced into long moderately stout spines which bend toward median line slightly; the basal part light, the distal part black with many hairs; they extend over half their length beyond posterior margin of last venter. Connexiva moderately broad.

Types.—Holotype, allotype, and forty paratypes in the Francis Huntington Snow Entomological collections; University of Kansas. The types were taken from Santos, Bolivia, S. A.; Dept. Haianuco, Peru, S. A.; R. Beni Cachuela, Esperanza, Bolivia, S. A.; Villarrica, Paraguay, S. A.; Vic. San Pedro, 900 m. a. s. l., Peru, S. A.; Rio Beni, Las Pampas, Bolivia, S. A.

Comparative notes.—Very closely related to *T. quadrilineatus*. The males have a shorter fore femur, deep and narrow channel on the mesosternum, and a much more distinctly doubly emarginate sixth venter. The females have much longer connexival processes and a very broad truncate last ventral abdominal segment.

5. *Tengogonus quadrilineatus* (Champion)

(Plate X, figs. 5, 5a)

Limnometra quadrilineata Champion, Biol. Centr.-Amer., Rhynch., II, 1898, pp. 150, 151, Pl. IX, fig. 17.

Tengogonus quadrilineatus Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., 1908, p. 209; Drake and Harris, Ohio Jour. Sci., XXVII, 1928, p. 273.

Two hundred and nine macropterous and several brachypterous specimens. These from San José, Costa Rica, C. A.; Riovirilla, Costa Rica, C. A.; Michoacan, Mex.; Guadalupe, Chiapas, Mex.; Rio Mayo Sonora, Mex.; El Salto Excuintla, Guatamela.

IV. Genus CYLINDROSTETHUS Mayr, 1865

Haplotype, *fieberi* Mayr, 1865 (= *producta* Spinola, 1840)

Hydrobates Erichson, in Schomburgk's Faun. Brit. Guinana, III, 1848, p. 614 (nec. Boie).
Cylindrostethus Fieber, Europ. Hemip., 1861, p. 33 (invalid); Mayr, Verh. Zool. Bot. Ges. Wein., XV, 1865, 444; Kirkaldy, Entomologist, XXX, 1897, 258; Bergroth, Ent. Mo. Mag., XIII, 1902, p. 258; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 210; Schmidt, Stett. Ent. Zeit., 76, 1915, p. 361; Torre-Bueno, Spolia Zeylandica, 13, 1925, p. 226.
Janias Distant, Fauna Br Ind., Rhynch., V. 1910, p. 148; Esaki, Ann. Mag. Nat. Hist., (10) 4, 1929, p. 416.

Body very elongate, cylindrical; antennae rather slender, moderately long; intermediate and posterior legs extremely long, their femora extending to or even a little beyond the last genital segment; front tarsi with segment II twice as long as I. Rostrum short, not attaining middle of prosternum. Eyes large, long, not exerted, placed obliquely on the sides of the head. Metasternum divided by a sinuate, transverse suture a little before hind margin. In apterous form pronotum rather short, not produced behind over mesonotum.

This genus is represented in the Western Hemisphere by six species. Winged forms of American species seem to be exceedingly rare and, herein, for the first time, a winged form is described.

KEY TO SPECIES OF CYLINDROSTETHUS

- 1a. Sixth venter of male doubly emarginate at apex (with a deep notch at the middle). mesonotum unicolorous, brownish to brownish black, longitudinally impressed along the sides 2a
- 1b. Sixth venter of male with a broad simple emargination at apex (without median notch). Mesonotum brownish, with conspicuous fuscous to black longitudinal stripes 4a
- 2a. Venters of fifth and sixth abdominal segments of male without evidence of median impression. Posterior margin or dorsum of mesothorax of female with two median, postero-dorsally directed lobes..... *bilobata* sp. nov.
- 2b. Venters of fifth and sixth (or just the sixth) abdominal segments impressed. Posterior margin of dorsum of mesothorax of female without two median postero-dorsally directed lobes 3a
- 3a. Mesonotum dark, fuscous to black. Male with fifth and sixth abdominal venters medianly impressed, connexival spines very stout, abdomen widened posteriorly.
erythropus (Herrich-Schaeffer)
- 3b. Mesonotum brownish, testaceous. Male with only sixth abdominal venter impressed on either side of a median ridge, connexival spines more slender, abdomen widening slightly, posteriorly *linearis* Erichson
- 4a. Length of first antennal segment subequal to width of head through eyes. Dark lines on mesothorax narrow and becoming indistinct posteriorly, connexival spines very short..... *hungerfordi* Drake & Harris
- 4b. Length of first antennal segment greater than width of head through eyes, dark lines on dorsum of mesothorax wide and prominent and extending over metanotum, connexival spines longer 5a
- 5a. First two antennal segments black. Connexival spines of male almost reaching to middle of first genital segment, pronotum of winged form extending to metanotum, black, except on margins and disc yellowish; female with connexival spines long, reflexed, and contiguous above genital segment, first genital longer than broad and ending in an acute point..... *palmaris* Drake & Harris
- 5b. First two antennal segments lighter, largely testaceous; connexival spines short, extending only a short distance past base of first genital; connexival spines of female shorter, first genital longer than broad but rounded on posterior dorsal margin.
regulus (White)

1. *Cylindrostethus erythropus* (Herrich-Schaeffer)

Hydrometra erythropus (Herrich-Schaeffer) Wanz. Inst., IX, 1850, p. 68, fig. 923. *Cylindrostethus erythropus* Schmidt, Stett. Ent. Zeit., 76, 1915, p. 362; Drake and Harris, Ann. of Carn. Mus., XXIII, p. 219, Pl. XXV, fig. e.

Two hundred and fifty-six apterous specimens. Solimoes River, Amazonas, Brazil, S. A.; Vic. Santo Antonio River, Brazil, S. A.; Rio Puras, Lago Berury, Brazil, S. A.

2. *Cylindrostethus linearis* (Erichson)

Hydrobatcs linearis Erichson, in Schomburgk's Fauna Brit. Guiana, III, 18, p. 164.

Cylindrostethus linearis (Erichson), Drake and Harris, Ann. Carn. Mus., 1934, XXIII, p. 220, Pl. XXV, fig. f.

Three hundred and thirty-two apterous specimens. Rio Madeira, Porto Velho, Brazil, S. A.; Vic. Joao Pessoa, Jurua River, Brazil, S. A.; Vic. Santo Antonio River, Eiru, Brazil, S. A.

3. *Cylindrostethus hungerfordi* Drake & Harris

Cylindrostethus hungerfordi Drake & Harris, Ann. of Carn. Mus., XXIII, p. 221, 1934

Holotype, allotype, and 4 paratypes. Four apterous specimens. Near New Amsterdam, British Guiana, S. A.

4. *Cylindrostethus palmaris* Drake and Harris

Cylindrostethus linearis Drake and Harris (nec. Erichson) Ann. Carn. Mus., XIX, 1930, p. 238.

Four hundred and four apterous and twenty-five macropterous specimens. Heretofore only wingless forms have been known in the genus. Apterous specimens from Lago Grande, state of Para, Brazil, S. A.

DESCRIPTION OF WINGED FORM

Size.—Length of males, 17 mm. to 19.5 mm., width: 2.5 to 3.5 mm.; females, length: 20 to 22.5 mm., width: 2.8 to 3.5 mm.

Color.—Head flavous. Base of antennae black. Pronotum black with lateral and caudal margins flavous; broadly rounded posteriorly, slightly carinate. Anterior lobe with a large heart-shaped flavous spot, median depression; posterior lobe transversely depressed on the posterior margin of the anterior third. Humeri moderately prominent, a slight transverse elevation between them. Surface of pronotum punctated, covered with short hairs. Hemelytra sometimes attaining the anterior margin of last abdominal segment and sometimes surpassing the posterior margin; uniformly brown except fulvous costal margin, nervures prominent.

Types.—Holomorphotype, allomorphotype, and 23 paramorphotypes. The holomorphotype, allomorphotype, and 15 paramorpho-

types from Esperanza, R. Beni Cachuela, Bolivia, S. A.; others from Supurumi Creek, British Guiana and Manaos Region, Rio Negro, Brazil, S. A.

In describing *C. palmaris* Drake and Harris credited the holotype and allotype from "Manacapura Amazonas (Solimoes River) Brazil, June, 1926, S. M. Klages" as belonging to the Carnegie Museum. This was an error. They are the property of the University of Kansas as there is documentary evidence from S. M. Klages to prove this, and they should be returned to the University of Kansas.

5. *Cylindrostethus regulus* (White)

Halobates regulus White, Journ. Linn. Soc. London, Zool., XIV, 1879, p. 488.

Cylindrostethus regulus Drake and Harris, Ann. Carn. Mus., XIX, 1930, p. 238, *ibid.* XXIII, 1934, p. 222.

Forty-one apterous specimens from following: R. Amazonas, Region de Itacoatiara, Brazil, S. A.; Vic. Santo Antonio, River Eiru, Brazil, S. A.; Vic. Joao Pessoa, River Jurua, Brazil, S. A.

6. *Cylindrostethus bilobata* Sp. n.

(Fig. 1)

Size.—Length of male, 14.00-15.00 mm.; width, 2.00-2.50 mm.; length of female, 16.00-17.00 mm.; width, 2.00-2.50 mm.

Color.—Dorsum and dorsolateral areas dark brown to black, connexiva much lighter, almost yellowish. Venter, not including anterior portion of mesonotum, light yellowish-brown. Pronotum with median longitudinal yellowish line. Head light brownish, antennal tubercles black, antennae brown. Anterior femora with yellowish stripe on dorsal side for three quarters of its basal length. Middle and hind femora long and thin, yellowish in color except at apices, tibia brown.

Structural characteristics.—Antennal proportions of male, 122:52:33:64; female, 151:55:33:66. Mesonotum longitudinally impressed along the dorsolateral sides. Abdomen parallel sided, connexival spines shorter and stouter than in *C. linearis* (Erichson). In the male the first genital above longitudinally impressed laterally, narrowing slightly posteriorly, the posterior margin subrounded; below it widens until the middle and then narrows posteriorly. The connexival spines are conical and directed posteriorly, slightly divergent. The last genital segment conical, shorter than the first, with moderately strong, triangular ventral antero-laterally projecting plates. In the female the caudal margin of mesonotum with two median dorso-posteriorly directed lobes, connexival spines much

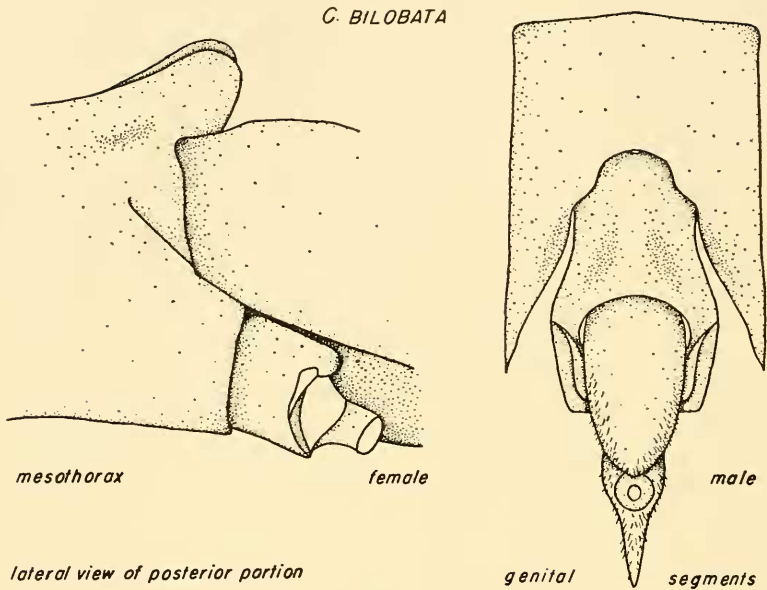


FIG. I.

shorter and ending in sharper points than in the male. Posteriorly, the connexiva fold medianly enveloping the abdomen; the spines are directed posteriorly and almost meet at the middle on the caudal margin. The first genital narrows posteriorly, laterally impressed on each side ventrally, dorsally rounded at apex. Last genital segment ending in a point, about as long as preceding one.

Comparative notes.—Very close to *C. linearis* (Erichson). The male differs from *C. linearis* in that the abdomen does not widen posteriorly, the connexival spines are a little shorter and stouter, the last abdominal venter is deeply and roundly excavated with an inconspicuous median tooth, and the ventral antero-laterally projecting plates distinctly shorter than in *C. linearis*. The females differ by having two dorso-posteriorly pointing median lobes on the caudal margin of the mesonotum and the connexiva folding medianly so that the very short, posteriorly directed, spines almost meet medianly.

Types.—Holotype, allotype, and four male and one female paratypes. All specimens bear the following label: Bolivia, S. A., River Beni Puerto, Salinas, 11-37, A. M. Olalla. Types in the Francis Huntington Snow Entomological Museum.

V. Genus POTAMOBATES Champion, 1898

Logotype, *unidentatus* Champion

Potamobates Champion, Biol. Centr.-Amer., Rhynch., II, 1898, p. 154; Kirkaldy, Trans. Amer. Ent. Soc., XXXII, 1906, p. 155; Kirkaldy and Torre-Bueno, Proc. Ent. Soc. Wash., X, 1908, p. 211.

Eyes oblique, not strongly exerted, coarsely faceted, feebly emarginate within posteriorly, rather narrowly separated anteriorly. Rostrum short, reaching to the mesosternum. Head subtriangular, produced and declivous in front. Anterior legs short, the femora stout and incrassate towards base; tarsi with basal segment short, less than half as long as the second; coxae widely separated. Middle and hind legs very elongate, the former longer; femora of hind legs longer and slenderer than intermediate ones; second segment of hind tarsi much shorter than first. Thorax elongate-trapezoidal, widening to the intermediate acetabula; pleura prominent, rounded externally; pronotum short, not produced behind in apterous form, covering the mesonotum in the winged form. Mesonotum flattened and shiny in apterous individuals.

The genital segments are asymmetrical in the male, and also in the female in some species. The left side of the second genital segment is produced postero-laterally into a peculiar platelike structure in the male in certain species, thus somewhat reminding one of the projections from this segment in *Cylindrostethus*; however, in American species belonging to the latter genus the genital segments are bilaterally symmetrical. Also it should be noted that the metasternum is divided by a transverse suture a little before its hind margin, the omphalium being placed in this suture as in *Cylindrostethus*. A few workers have erroneously considered the basal part of this division of the metasternum as the first segment of the venter, which in their opinion possesses seven visible segments instead of six. In both *Cylindrostethus* and *Potamobates* the anal opening is closed by a hard, circular, platelike structure. Champion considered the genus to form a sort of connecting link between the *Gerrinae* and the freshwater *Halobatine* forms.

This interesting genus of water striders extends from Mexico to Peru. Two species described from Mexico; three from Costa Rica; one from Colombia, S. A.; one from Ecuador; and three from Peru. Ten species are known.

1. *Potamobates variabilis* Hungerford

Potamobates variabilis Hungerford, Jour. Kan. Ent. Soc., July, 1938, XI, No. 3, pp. 85-87.

Holotype, allotype, and two paratypes. Twenty-three apterous specimens. All from vicinity of Afilador, Peru, S. A.

2. *Potamobates woytkowskii* Hungerford

Potamobates woytkowskii Hungerford, Bull. Brook. Ent. Soc. XXXII, No. 4, pp. 144-145.

Holotype, allotype, and fourteen paratypes. Thirty-seven apterous specimens. Vicinity of Rioja, Dept. San Martin, Peru, S. A.

3. *Potamobates peruvianus* Hungerford

Potamobates peruvianus Hungerford, Bull. Brook. Ent. Soc., XXXI, pp. 178-180.

Holotype, allotype, and eighty-three paratypes. Forty-nine apterous and macropterous specimens. Vicinity of Sani Beni, Peru, S. A.

4. *Potamobates williamsi* Hungerford

Potamobates williamsi Hungerford, Bull. Brook. Ent. Soc. XXVII, 1932, p. 228.

Holotype, allotype, and seventeen paratypes. Two hundred and five specimens, apterous and macropterous forms. Types from Tena and Mera, Ecuador, S. A.; others: Rio-Napo water shed, Jotun, Yacu, Ecuador, S. A.; Puyo near Mera Oriente, Ecuador, S. A.; Tena and Mera, Ecuador, S. A.

5. *Potamobates tridentatus* Esaki

Potamobates tridentatus Esaki, Ann. Mus. Nat. Hung., XXIII, 1926, p. 251, fig. 1.

Apterous and macropterous forms. San Isidro del Gen., Costa Rica, C. A.; Ft. Clayton, Canal Zone. Not heretofore known from Canal Zone. Eleven specimens, one winged male.

6. *Potamobates osborni* Drake and Harris

Potamobates osborni Drake and Harris, Proc. Biol. Soc. Wash., 41, 1928, p. 25.

No representatives.

7. *Potamobates horvathi* Esaki

Potamobates horvathi Esaki, Ann. Mus. Nat. Hung., XXIII, 1926, p. 254, fig. 2; Drake and Harris, Proc. Biol. Soc. Wash., 41, 1928, p. 26.

Two hundred and two apterous and one macropterous specimens. Punta Gorda, British Honduras, C. A.; Ft. Clayton, Canal Zone; Les Amates, Guatemala; San Vicente Chiapas, Mexico. Not heretofore recorded from Canal Zone.

8. *Potamobates unidentatus* Champion

Potamobates unidentatus Champion, Biol. Centr.-Amer. Rhynch., II, 1898, p. 155; Esaki, Ann. Mus. Nat. Hung., XXIII, 1926, p. 251.

All apterous specimens. Eleven specimens from San Isidro del Gen., Costa Rica, C. A.

9. *Potamobates bidentatus* Champion

Potamobates bidentatus Champion, Biol. Cent.-Amer., Rhynch., II, 1898, p. 155; Pl. IX, figs. 22 and 22a.

No representatives. Two female specimens similar to *Potamobates tridentatus* but lacking the twisted process of the first dorsal genital segment, have been placed here for the present.

10. *Potamobates thomasi* Hungerford

Potamobates thomasi Hungerford, Journ. Kan. Ent. Soc., Vol. 10, No. 2, April, 1937, pp. 63-65.

Holotype, allotype, and ten paratypes. Apterous and macrop-terous specimens. Twenty-five specimens. El Sabino, Uruapan, Michoacan, Mexico; District of Temascaltepec, Tejupileco, Mexico.

PLATE X

Tenagogonus opacus Champion

FIG. 1. Ventral view of female last abdominal segment.

FIG. 1a. Lateral view of male genital segments.

Tenagogonus celocis Drake and Harris

FIG. 2. Ventral view of female last abdominal segment.

FIG. 2a. Lateral view of male genital segments.

Tenagogonus spinulatus sp. n.

FIG. 3. Ventral view of female last abdominal segment.

FIG. 3a. Lateral view of male genital segments.

Tenagogonus duolineatus sp. n.

FIG. 4. Ventral view of female last abdominal segment.

FIG. 4a. Ventral view of male genital segments.

Tenagogonus quadrilineatus (Champion)

FIG. 5. Ventral view of female last abdominal segment.

FIG. 5a. Ventral view of male genital segments.

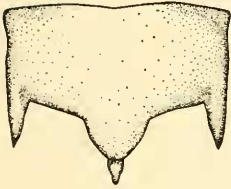
PLATE X



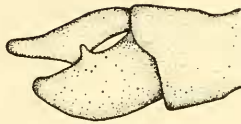
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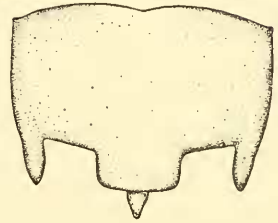
2a



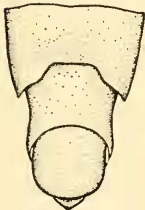
1. *T. OPACUS*



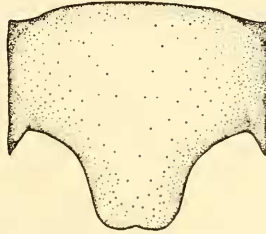
3a.



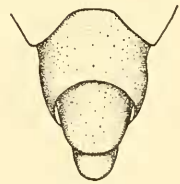
2. *T. CELOCIS*



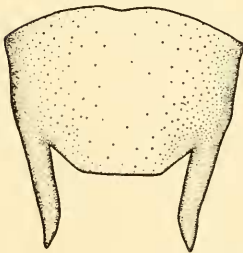
4a.



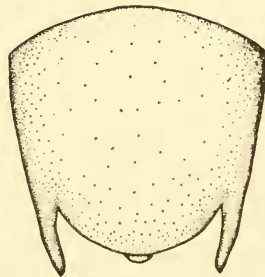
3. *T. SPINULATUS*



5a



4. *T. DUOLINEATUS*



5. *T. QUADRILINEATUS*